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ABSTRACT

Ninety college students (63 women and 27 men) completed a questionnaire on computer use and attitudes toward computers. They also completed the Bem Sex Role Inventory. Results indicated no sex differences in frequency or purpose of computer use. Analysis of variance and chi square analysis by gender role orientation resulted in several significant differences. Androgynous subjects liked computers better and were more confident in their ability to use computers than were masculine subjects. Feminine and undifferentiated subjects were most likely to avoid registering for courses which involve computer work. Data are presented in two tables. (10 references) (Author/GL)

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Sex and Gender as Predictors of Attitudes Toward Computers: The Gap Narrows.

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Abstract

Ninety college students (63 women, 27 men) completed a questionnaire on computer use and attitudes toward computers. They also completed the Bem Sex Role Inventory. Results indicated no sex differences in frequency or purpose of computer use. Analyses of variance and chi square analyses by gender-role orientation resulted in several significant ($p < .05$) differences. Androgynous Ss liked computers better and were more confident in their ability to use computers than were masculine Ss. Feminine and undifferentiated Ss were most likely to avoid registering for courses which involve computer work. Other results will be reported and their implications discussed.

Sex and Gender as Predictors of Attitudes Toward Computers: The Gap Narrows.

Although women have been involved with the use of computers and the development of computer technology from the very beginning (Augusta Ada Lovelace wrote the instructions for Babbage's first computing machine in the 1800's), many people consider computer use to be a masculine activity. Teachers introducing computers in grammar school classrooms have pointed out that boys are far more eager to try the machines, demand more time to use them while the girls stand in the background and watch, and are more likely to report enjoying the computer activities (Liss-Levinson, 1985). Feminists have worried that this gender imbalance would lead girls to avoiding computer courses and therefore being less well prepared for the many careers which depend on computer use (Webster, 1985).

Studies which have examined sex differences in computer course enrollment (Korpi, 1984 - cited in Lockheed, 1985; Revelle, Honey, Amsel, Schauble, & Levine, 1984) report that a higher proportion (from 5:1 to 2:1) of males participate in computer science courses. Males outnumber females in computer camps by 3:1 (Lockheed, 1985) and use school-based computer centers more often, by ratios ranging from 20:1 to 3:2

(Collis, 1985; Lockheed, Neilson, & Stone, 1983; McKelvey, 1984 - cited in Lockheed, 1985). A national survey found that men are significantly more likely than women to use home computers (USA Today, 1984). Furthermore, several studies have found that males have more positive attitudes toward computers than do females (Dambrot, Watkins-Malek, Silling, Marchall, & Garver, 1985; Lockheed, Neilson, & Stone, 1983; Wilder, Mackie, & Cooper, 1985). No studies which used gender-role orientation as a variable could be located.

All of the researchers cited above collected their data in the early 1980's. The present study was conducted to determine whether there have been changes in the computer literacy gender gap in the late 1980's. This paper examines sex differences as well as gender-role orientation differences in computer use and attitudes toward computers.

Method

Subjects

A random sample of 200 students (approximately half were women and half were men) at a small, liberal arts college in New England were invited to participate in this study. Ninety questionnaires (45%) were returned; 63 from women (mean age 21.5 yr., range 18 - 52 yr.) and 27 from men (mean age 21.0 yr., range 18 - 23 yr.).

Five subjects did not properly complete the gender-role orientation measure and so were not included in the gender-role analyses. Twenty-five percent of the subjects were feminine, 22% were masculine, 36% were androgynous, and 17% were undifferentiated.

Questionnaires

The questionnaire[1] used in this study was designed to obtain information regarding how often and for what purposes the subjects used computers, attitudes toward computers, and attitudes toward math and science which are often associated with computer use. A total of 32 questions were asked, several of which had multiple parts, such as items which asked subjects to agree or disagree with statements about computers (e.g., "Learning to use a computer is a worthwhile achievement."). Other questions required subjects to circle "yes" or "no" (e.g., "Does math make you anxious?"), check a multiple choice category (e.g., "If you do not now or have never used a computer, why not? a) lack of interest, b) lack of opportunity, c) no need to use, d) fear of failure, e) other."), or respond on a seven point likert scale ranging from very low to very high (e.g., "How would you rate your confidence in your ability to use computers?"). Several items requested subjects to answer in their own words (e.g., "Have you

ever had a bad experience with a computer? If yes, please describe it.").

The Bem Sex Role Inventory (BSRI; Bem, 1974) was appended to the questionnaire. The BSRI consists of 60 adjectives, 20 of which are stereotypically feminine, 20 are stereotypically masculine, and 20 are filler items without gender-role connotations. Subjects indicate on a seven point likert scale how well each adjective describes themselves. The inventory yields the following descriptions: androgynous, feminine, masculine, and undifferentiated.

Procedure

A random sample was drawn from the student directory. Subjects received a letter from the experimenters requesting their participation, a copy of the questionnaire and the BSRI, and a postcard stating that the questionnaires had been completed and returned. Subjects were asked to complete the questionnaires, sign the postcard and indicate on it if they wanted to receive the results of the study, and return both the questionnaires and the postcard (separately) to a post office box on campus. As the postcards came back, the names of the respondents were checked off on a master list. Two weeks after the initial contact, subjects who had not responded were telephoned and encouraged to

complete the questionnaires and send them in.

Results

Everyone who responded to the survey reported having had experience using computers. There was no sex difference in the age at which they first used a computer (mean age = 17 yr.) nor in the purposes for which they used computers; the most common use was word processing. Males were not more likely than females to own a computer, to have taken a computer course, or to feel comfortable using a computer. However, the women reported liking science and mathematics significantly ($p < .001$) more than did the men (See Table 1). It is important to note that neither group was very enthusiastic. The mean scores are clearly in the low to middle range on the seven point likert scale.

Insert Table 1 about here

The analysis by gender-role orientation yielded several significant differences. Feminine and androgynous subjects reported liking mathematics significantly ($p < .001$) more than did the undifferentiated subjects. Androgynous subjects liked computers significantly ($p < .01$) more than did masculine subjects and were significantly ($p < .03$) more confident in their

ability to use computers than were the masculine subjects. See Table 2. The feminine and undifferentiated subjects fell in between the androgynous and masculine subjects on these measures and were not significantly different from the other groups.

Insert Table 2 about here

Chi square analyses yielded several significant ($p < .05$) gender-role differences. Feminine subjects were most likely and androgynous subjects least likely to report experiencing math anxiety. Feminine and androgynous subjects were most likely to report having taken a computer course. Feminine and undifferentiated subjects were most likely to report having avoided registering for courses which involve computer work; androgynous subjects were least likely to report having done so. Feminine and undifferentiated subjects were least likely to use a computer for calculations. Androgynous subjects were most likely to prefer a computer for writing papers and masculine subjects were least likely to prefer the computer for writing papers; several masculine subjects wrote that they prefer to hire a typist.

The majority (49%) of the subjects reported that

they used computers both because they enjoyed them and because of their functions. More than half the subjects reported feeling comfortable with computers (72%) and wanting to work with them in the future (68%). The subjects were more comfortable with word processing software than they were with mathematical uses; 73% prefer the computer for writing papers yet 68% prefer a calculator for math problems.

In general, the subjects had positive and realistic attitudes toward computers. Everyone agreed that learning to use a computer is a worthwhile achievement. The majority of the students agreed that everyone should learn to use a computer (79%), that computers are beneficial to people (99%), that businesses and schools should rely on computers for various tasks (84%), and that everyone has the ability to use a computer (89%). The majority disagreed with the statements: only people who are good at math and science can use computers (97%), computers are more accurate than people (59%), and computers are smarter than people (90%). The most common descriptions of computers included: efficient (82%), challenging (77%), good (70%), interesting (66%), and necessary (63%).

Discussion

It is not surprising that the results show fewer sex differences in computer use and attitudes than have been found in previous research. With the proliferation of computers at home, at school, and in the workplace, women and girls are no longer able to avoid them and men and boys are no longer able to claim them. Our subjects had their first experience with computers in a variety of settings: in grammar school, high school, and college courses; playing games on a home computer; learning word processing or data entry on the job. The young women in our survey realize that computers are in use everywhere and have signed up for computer science courses and taken advantage of other opportunities to become familiar with computers and their uses.

It is difficult to avoid computers on campus in 1989. When asked if they have ever been required to use computers in their classes, 51% said they had; the courses most frequently listed were in the computer science and psychology departments. Asked which majors they associated with computer use, 21 different subject areas were listed including anthropology, art, child development, and music. Nineteen percent of the respondents remarked that computers are used in every major. The library card catalogue and the language

laboratories have also been computerized.

Familiarity does not always increase liking, however. Several students commented that they hated computers; others made it clear that they prefer not to use them. When asked if they had ever had a bad experience with a computer, 32% responded that they had lost text or files and 12% described difficulties in learning or using software packages. Others complained of frustrations in learning to write programs, printer problems, systems "going down", and discs "crashing." Still, most of the students were learning to cope with the frustrations in exchange for the benefits of computer use.

The androgynous subjects seemed to be the most enthusiastic about computers. They liked computers, were confident in their ability to use them, preferred them for both writing papers and doing calculations, and were unlikely to avoid registering for courses involving computer work. What is surprising, however, is the finding that masculine subjects liked computers least and were least confident in their ability to use them. Since computers have been associated with masculine activities such as mathematics and science and used primarily by men and boys, one would expect the masculine subjects to be at least as enthusiastic as the

androgynous subjects. This may be explained by the fact that our subjects used computers primarily for word processing; thus, the masculine subjects may view computer use as little more than typing and thus not as something they particularly like or at which they ought to excel.

Also unexpected was the finding that the women liked math and science significantly more than did the men, although neither group was enthusiastic. These students are attending a liberal arts college where the most popular majors are economics, English, government, history, and psychology. Although the college offers a wide variety of science and math courses, they are not popular courses. Such a finding would probably not occur in a sample of university students which would include more math and science majors.

Yet, the fact these are liberal arts students is what gives this particular study its meaning. Women and men in technical fields have no doubt long been equally well versed in computer use. It is those women and girls who have shied away from math and science who have also lagged behind men and boys in their attitudes toward and experience with computers. To read the enthusiastic comments of the women in our survey is to conclude that the gender gap in computer literacy is

narrowing.

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Footnotes

[1]A copy of the questionnaire is available from the first author.

Table 1

Means, standard deviations, and *t* ratios (*df* = 88) for ratings of how much the women (*n* = 63) and men (*n* = 27) like science and mathematics.

	Women	Men	*t*
Science			
M	4.3	3.5	1.91*
SD	1.8	1.8	
Mathematics			
M	3.9	3.1	1.90*
SD	1.9	1.9	

* $p < .001$

Table 2

Means, standard deviations, and *F* ratios (*df* = 3, 82) for ratings of how much the androgynous (*n* = 31), undifferentiated (*n* = 14), masculine (*n* = 19), and feminine (*n* = 21) subjects liked mathematics and computers and how confident they were in their ability to use computers.

	Andr.	Undif.	Masc.	Fem.	*F*
Mathematics					
M	4.2	2.2	3.3	4.3	5.27***
SD	2.0	1.7	1.6	1.7	
Computers					
M	5.6	4.5	4.3	4.6	4.07**
SD	1.3	1.0	1.8	1.6	
Confidence					
M	4.7	3.6	3.4	3.8	3.29*
SD	1.3	1.8	1.8	1.4	

* $p < .03$ ** $p < .01$ *** $p < .001$